WORKSHEET

CALCULATIONS REGARDING THE EXTENT OF CONTAMINATION IN THE GULF OF MEXICO

Deepwater Horizon Incident 4/20/2010 to Present

12/2/2011

Introduction: The following worksheet attempts to layout the parameters of existing contamination from the Deepwater Horizon (DWH) incident currently in the Gulf of Mexico (GOM) and, based on those figures, to predict future levels of contamination that can reasonably be expected within given periods of time. The purpose of these calculations is to give decision makers an understanding of what the potential realities are, although what is laid out here is in no way the "worse case scenario". They are provided in the hope that a change in cleanup response to safer, non toxic solutions will be allowed to mitigate the growing contamination present in order to restore our GOM waters to pre-spill conditions. Only this avenue will minimize the magnitude of predictable consequential economic damages.

CONTAMINATION WORKSHEET

Definition: *Contaminate* – to pollute, taint, infect, poison.
Ref: Collins English Dictionary

- Toxicity for LA sweet crude oil has a toxicity of 2.9 based on EPA tests cited at: http://www.epa.gov/bpspill/reports/phase2dispersant-toxtest.pdf
- The **Toxicity value** (LC 50[1] for Corexit 9527) is 2.0 on one species and 4.0 on another species, so averaged this becomes 3.0 (meaning that 50% of the test species died within 96 hours once it came in contact with an average of 3 parts Corexit to one million parts water).
- **Contamination factor**: 1,000,000/3= **333,333.33** (This is how many gallons of water one gallon of Louisiana Light Sweet crude oil and/or Corexit 9527 will contaminate.) This information can be found on the US EPA web site.
- No one knows with absolute certainty the actual number of gallons of oil that was discharged from the Macondo Reservoir between April 22nd when the oil first

[1] LC stands for "Lethal Concentration". LC values usually refer to the concentration of a chemical in air or water. The concentration of the chemical that kills 50% of the test animals in a given time (generally between 4 to 96 hours) is the LC_{50} value. Reference: Canadian Centre for Occupational Health and Safety: http://www.ccohs.ca/oshanswers/chemicals/ld50.html#_1_2

began to gush and July 20th when capping of the well was publicized.

- Scientific speculation about compromised sea floor and uncontrollable, gushing fissures created by the DWH disaster came to the public's attention when Geohazards expert BK Lim wrote a strong letter of concern to Congress on 1/14/2011 with attached videos taken by remotely operated vehicles of the seabed around the rig and his expert analysis of them. As the oil spill was reported to be capped after 100 days, and a total of 200 million gallons of "spilled" oil were acknowledged at that time, this averages out to 2 million gallons of oil spilled per day.
- Dispersant use began as a result of RRT protocols that dictated their utilization to treat the discharge. This continued until the discharge, per official reports, was halted on or about 7/29/2010 roughly 100 days +/- after it began at which time EPA reportedly instructed the responsible party to stop the dispersant use.
- **Dispersant Ratio calculation for event:** At this time, BP/EPA/Coast Guard reported volume of oil released into the GOM from the blowout was stated to be +/- 200 million gallons. Also published were statements that a little less than 2 million gallons of dispersants were used to sink the oil. (This establishes an oil to dispersant applied ratio as published by both BP and EPA.) **This ratio is 100 gallons of oil to 1 gallon of dispersant. (***Accuracy of the contamination of the GOM is subject to the accuracy of the amount of contaminants reported to the public. It is highly recommended that federal oversight afford more transparency through the utilization of inspection by independent 3rd party scientists to confirm the accuracy of volume of current flow.*)
- As of late November 2011, BP has stated that the purpose of the large number of oil-related vessels that are stationed around the well site are to study "natural seepage" from the seabed. As no natural seepage was reported in the initial geological surveys done prior to the drilling of the DWH well, BK Lim's analysis of what has occurred to the seabed floor as a result of the blowout and subsequent explosion appears to be confirmed.
- Many photographs and videos, as well as reported visual sightings confirm continued application of toxic dispersants and/or sinking agents to the present.

With the seabed floor around the Macondo formation fractured and releasing oil into the Gulf's waters on a continuing basis, it is vitally important to understand the amount of contamination present in order to make decisions related to proper cleanup response and damage mitigation.

Based on the points stated above, as of this writing, approximately 621 days of uncontrollable hydrocarbons have released into Gulf waters, with an unnamed amount of toxic dispersant and/or sinking agents now present in the GOM water column emanating from the Macondo Formation.

The amount of oil contamination is determined by multiplying the number of days (621) X (2 million gallons/day) yielding oil contamination in gallons of oil present in the GOM water column to be +/- 1242 billion gallons of oil.

- The amount of dispersants suspected to be present in the Gulf of Mexico water column

can be calculated by using the oil to dispersant ratio applied as stated above to be (100/1). If the leakage rate is accurate, then an amount stated to be present in the GOM that is probable is **1.242 billion gallons** of oil. The suspected amount of dispersants likely to be present is **12,420,000 gallons of dispersants** which is calculated by applying the ratio of 100/1**. Thus the total presumed oil and dispersant contamination is +/- 1,254,420,000 gallons**.

- Multiplying the amount of oil/dispersant (1,254,420,000 gallons) times the contamination factor of 333,333.33, the total is **+/- 418,139,995,818,600.00 gallons of contaminated GOM water.**
- There are an approximate 643 quadrillion gallons of water in the Gulf of Mexico per the EPA's official web site.
- 418,139,995,818,600 / 643,000,000,000,000,000 equals the percentage of total water contamination suspected to be in our GOM waters at present = .**065%.**

This calculation is as of December 2nd, 2011 representing educated estimates that .065% of our entire GOM water column is most likely contaminated with toxins derived from the oil and applied dispersants after 621 days of ongoing leakage.

Contamination is growing steadily as discharge of hydrocarbons continue unabated with toxic dispersants and/or sinking agents being applied. Per analyses of video documentation by BK Lim, cementing efforts have failed to stem the flow of oil through newly created fissures into the GOM waters.

Previous Warnings and Requests

In March, David Fa-Kouri and Louisiana State Senator AG Crowe met with US Congressmen and/or their top Aides to raise awareness of the increasingly disastrous situation developing in the GOM and asked that they consider a direct change in the federal response from toxic dispersant to a safer bioremediation product (Oil Spill Eater II, OSE II) that was already on the EPA's approved list of products on the National Contingency Plan (NCP) for oil spill cleanup. OSE II would effectively clean up the hydrocarbon contamination and deliver a safe and scientifically defined end result of CO2 and water. It is important to note that the responsible party, multiple state Regional Response Team (RRT) members, and local Gulf civic leaders had already made formal requests to use this NCP solution. Each of these requests was ignored. Additionally, it was recommended for use by USCG New London CT test labs on July 10th, 2011 after multiple official and scientific vettings. EPA officials verbally denied authorization and, when requested by the Louisiana Department of Environmental Quality to put their reasoning in writing, has, again, ignored the request.

OSE II is the only cost-effective mitigation solution available that could clean up both the surface and subsurface open ocean waters, beaches, marshes and estuarine environment, and that could additionally contain any on-going seepage in the finite geographic area around the fissure until it can be mechanically plugged. [See full documentation under "Technical Library" at www.osei.us.] At the time of those meetings, collateral damage to the public's health as a result of the use of the highly toxic chemical dispersants was a

serious concern that has now become a reality as medical, insurance, and private reports claim debilitating and life-threatening health consequences resulting from exposure.

BP and USCG received proposals in 2010 from the OSEI Corporation and its representatives to use OSE II coupled with application engineering supplied from MIT to abate both surface and subsurface contamination. OSEI representatives offered a means to safely mitigate the subsurface hydrocarbon plumes present last year in the GOM waters.

DETOXIFICATION OF GULF WATERS IS THE ONLY OPTION AVAILABLE TO HALT THE SWELLING CONTAMINATION AND PREDICTABLE ATTENDANT PROBLEMS TO THE PUBLIC'S HEALTH, THE FISHERIES, THE TOURISM INDUSTRY, AND THE ENVIRONMENT.

Based on the above calculations, the trend shows 1% of the total volume of water in the GOM will be contaminated by September of 2012.

Based on the volume of oil in the Macondo Reservoir, combined with the attendant pressure levels, the ongoing, unnatural seepage could continue for approximately 20-30 years.

Predictions below are based on the two assumptions that 1) no decontamination with OSEI is allowed to occur, and 2) toxic chemical dispersant and/or sinking agent use is allowed to continue.

Using the above calculations, it is estimated that **11.6** % of total GOM waters will be contaminated over a 30-year period. Due to the utilization of toxic chemical dispersants, the ability of naturally occurring microbes to degrade the oil has been largely diminished as confirmed by Woods Hole Oceanographic Institute (WHOI) findings released January 27th, 2011. Because of the highly toxic nature of the contamination resulting from the combined oil and chemical dispersant, all forms of aquatic life are being impacted, as well as human health, as toxic Volatile Organic Compounds (VOCs) continue to gas off and cross contaminate other areas.

Calculations: Using the figure of ***2 million gallons a day*** being released into Gulf waters as a result of the DWH blowout, we added to this the estimated amount of Corexit based on the earlier application of 100/1 ratio of oil to Corexit openly authorized by the EPA. [See EPA web site] This amount of combined oil and toxic dispersant would result in 930 days of on-going contamination for the Gulf waters to reach the level of one percent contamination. Thus, every 930 days, or every 31 months, the gulf waters will grow in contamination by 1 percent. Based on the estimate that the contamination duration is expected to be 30 years or 360 months, then the GOM contamination would be approximately 11.6% of the total GOM waters.

KEY:

D =dispersant contamination

O =oil contamination
g = gallons
d =day
333,333.33 = contamination factor from EPA table relative to toxicity of oil and dispersant
100/1= oil to dispersant application ratio derived from calculated amount of oil present,
643 Quadrillion = constant volume of water present in the GOM

Amount of contamination on 2/24/2011 (308 days since initial blowout):

(308 days X 2,000,000 g/d(O) = 616,000,000g(O) + 6,160,000 g(D) = 622,160,000 (total gal. of contamination O+D) X 333,333.33 = 207,386,664,592,800/643,000,000,000,000,000 X 100 = .03225298046547, rounded to .**032** % of the GOM waters contaminated on 2/24/2011 at 308 days.

Contamination as of 12/20/2011 (621 days):

621 days X 2,000,000 g/d(O) = 1,242,000,000g(O) + 12,420,000 g(D) = 1,254,420,000 (total gal. of contamination O+D) X 333,333.33 = 418,139,995,818,600.00 / 643,000,000,000,000,000 X 100 =.065029548338818 rounded off to be **.065 % of the GOM waters contaminated as of 12/2/2011**

How long before 1% contamination of total GOM is reached? **930 days**

With oil leakage maintaining the same or higher level, and with toxic dispersant and/or sinking agents continuing to be used in similar quantities, **11.6% contamination of the total GOM waters** can be expected in a 30-year time period.

David Fa-Kouri,
Strategic Economist

Disclosures:

No one knows, with certainty, exactly how much DWJ oil is remaining in the GOM water column as a result of the Deepwater Horizon disaster. Based on the information publically available, the data discussed in this worksheet and Strategic Consulting Group's subsequent economic decision point paper are deemed by our staff to be an accurate, conservative assessment of the current situation in the Gulf of Mexico.

The purpose of these calculations is to give decision makers an understanding of what the potential realities are, although they are in no way the "worse case scenario".

Strategic Consulting, Inc. has made a direct request through Garret Graves of the Governor's office of the State of Louisiana to the US Coast Guard's Federal On Scene Coordinator, Captain Hein, on August 25th, 2011, for independent scientists, utilizing a

manned submersible vehicle, to view the seabed floor to verify the condition of the wellheads and seabed floor attendant to the Deepwater Horizon blowout. This request has not been addressed as of this date. Per aerial photographs, video documentation, and a BP press release, BP has multiple oil-related ships actively present at the site of the DWH wellhead working on issues related to sea floor seepage. On-going plumes of massive amounts of fresh oil sightings that have occurred since August, subsequently verified through lab tests as oil from the Macondo/DWH, irrefutably point to ongoing and unnatural oil seepage.